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Annotated Bibliography on the Biology of the Menhadens, Genus *Brevoortia*, 1963-1973

JOHN W. REINTJES and PEGGY M. KENEY

Seattle, WA
April 1975

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638. Length-weight relations of haddock from commercial landings in New Engla 1931-55. By Bradford E. Brown and Richard C. Hennemuth. August 1971, v + 13 pp., 16 figs., 6 tables, 10 appendix A tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

639. A hydrographic survey of the Galveston Bay system, Texas 1963-66. By E. J. Pul W. L. Trent, and G. B. Adams. October 1971, v + 13 pp., 15 figs., 12 tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

640. Annotated bibliography on the fishing industry and biology of the blue cr *Callinectes sapidus*. By Marlin E. Tagatz and Ann Bowman Hall. August 1971, 94 pp. sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

641. Use of threadfin shad, *Dorosoma petenense*, as live bait during experimental p and-line fishing for skipjack tuna, *Katsuwonus pelamis*, in Hawaii. By Robert T. Iversen. August 1971, iii + 10 pp., 3 figs., 7 tables. For sale by the Superintende Documents, U.S. Government Printing Office, Washington, D.C. 20402.

642. Atlantic menhaden *Brevoortia tyrannus* resource and fishery—analysis of decli By Kenneth A. Henry. August 1971, v + 32 pp., 40 figs., 5 appendix figs., 3 table appendix tables. For sale by the Superintendent of Documents, U.S. Government Print Office, Washington, D.C. 20402.

643. Surface winds of the southeastern tropical Atlantic Ocean. By John M. Steigner and Merton C. Ingham. October 1971, iii + 20 pp., 17 figs. For sale by the Superintende Documents, U.S. Government Printing Office, Washington, D.C. 20402.

644. Inhibition of flesh browning and skin color fading in frozen fillets of yelloweye snapper (*Lutzanus vivanus*). By Harold C. Thompson, Jr., and Mary H. Thompson. February 1972, iii + 6 pp., 3 tables. For sale by the Superintendent of Documents, U Government Printing Office, Washington, D.C. 20402.

645. Traveling screen for removal of debris from rivers. By Daniel W. Bates, Ernest W. Murphey, and Martin G. Beam. October 1971, iii + 6 pp., 6 figs., 1 table. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

646. Dissolved nitrogen concentrations in the Columbia and Snake Rivers in 1970 a their effect on chinook salmon and steelhead trout. By Wesley J. Ebel. August 1971, iii + 7 pp., 2 figs., 6 tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

647. Revised annotated list of parasites from sea mammals caught off the west coast North America. By L. Margolis and M. D. Dailey. March 1972, iii + 23 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Continued on inside back cover.

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UNITED STATES
DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
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JOHN W. REINTJES and PEGGY M. KENEY[1]

ABSTRACT

A bibliography that consists of 444 references on the classification, distribution, abundance, life history, and ecology of American menhadens, genus *Brevoortia*. Included are references to menhaden published from 1963 through 1973 with those references published prior to 1963 that were omitted from menhaden bibliographies by Reintjes et al. (1960) and Reintjes (1964a). Brief annotations and a subject index are included.

INTRODUCTION

This bibliography is a continuation of those compiled by Reintjes et al. (1960) on the biology of the American menhadens and by Reintjes (1964a) on the menhadenlike fishes of the world. The literature included in this work includes the references published from 1963 through 1973 with those references published before 1963 that were omitted from the two bibliographies mentioned.

In reviewing the literature certain subject areas were used to decide which references should be listed. Included, in general, were references to taxonomy, distribution, occurrence, abundance, life history, morphology, ecology, and behavior. Excluded, generally, were references on the technological aspects of the fishery and the processing industry; daily, monthly, and annual landing reports and statistics; popular accounts in trade journals, newspapers, and magazines; and administrative and project reports. Mimeographed or similarly processed reports of an established series and special reports principally concerned with the biology of menhaden have been included as well as doctoral dissertations and master's theses that contained information on menhaden biology.

Arrangement of the references is alphabetical by author's surname. With multiple authors, the entry is made only under the senior author's name. Each author's works are listed chronologically by year of publication and those published in the same year are given alphabetical sequence by title. Anonymous articles are listed by the name of the journal or the originating agency.

Brief annotations of the contents of the publications that apply to menhaden and the scientific names of the species of *Brevoortia* concerned are given. This annotation is not done to make value judgments of the papers but to give clearer descriptions of the contents than can be obtained from their titles.

We acknowledge the help we received from Ann B. Hall, librarian, and the menhaden research staff of the Atlantic Estuarine Fisheries Center.

[1]Atlantic Estuarine Fisheries Center, National Marine Fisheries Service, NOAA, Beaufort, NC 28516.

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1969. Embryogenesis, histology and organology of the ovary of Brevoortia patronus. Gulf Research Reports, vol. 2, no. 4, p. 333-434.

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Commercial Fisheries Review.

1963. Menhaden. Commercial Fisheries Review, vol. 25, no. 2, p. 36-37.

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Commercial Fisheries Review.

1967. Bureau of Commercial Fisheries programs. "Bowers" uses lights and recorders. Commercial Fisheries Review, vol. 29, no. 89, p. 23.

First-year-class menhaden, B. patronus, were attracted at night to artificial white lights in the Gulf of Mexico.

Compton, Henry.

1965. A survey of fish populations in the inshore Gulf of Mexico off Texas, p. 55-86. In Texas Parks and Wildlife Department. Coastal Fisheries Project Reports, 1965.

B. patronus and B. gunteri mentioned.

Cooper, Richard Arthur.

1965. An unusually large menhaden, Brevoortia tyrannus (Latrobe), from Rhode Island. Transactions of the American Fisheries Society, vol. 94, no. 4, p. 412.

Largest known specimen measuring 470 mm in total length and weighing 1,674 g.

Copeland, B. J.

1965. Fauna of the Aransas Pass Inlet, Texas. I. Emigration as shown by tide trap collections. Publications of the University of Texas, Institute of Marine Science, vol. 10, p. 9-21.

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Coston, Linda C.

1971. Summary of tags released and recovered for the Atlantic menhaden, 1966-69. National Marine Fisheries Service, Data Report 66, 117 p.

Results of ferromagnetic internal tagging of B. tyrannus.

Crance, Johnie H.

1969. A selected bibliography of Alabama estuaries. Alabama Marine Resources Laboratory, Marine Resources Bulletin, no. 2, 21 p.

Includes references to menhaden.

Crance, Johnie H.

1971. Description of Alabama estuarine areas--cooperative Gulf of Mexico estuarine inventory. Alabama Marine Resources Laboratory, Marine Resources Bulletin, no. 6, 85 p.

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Crittenden, Edward.

1958. A pre-impoundment fishery study of North Bay and associated waters, Bay County, Florida. Proceedings of the 11th Annual Conference, Southeastern Association of Game and Fish Commissioners, 1957, p. 211-219.

Number and weight of B. smithi in collections of fish by gill nets, rotenone, and explosives.

Croker, Robert A.

1965. Planktonic fish eggs and larvae of Sandy Hook Estuary. Chesapeake Science, vol. 6, no. 2, p. 92-95.

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Cromer, Paul L.

1969. Fish and pollution: Experimental studies on the Atlantic menhaden, Brevoortia tyrannus. M.S. thesis, Long Island University, New York, 61 p.

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Cronin, L. Eugene.

1968. The protection of Maryland's estuarine areas. Proceedings of the Gulf and Caribbean Fisheries Institute, 20th Annual Session, 1967, p. 44-54.

Menhaden mentioned.

Cross, Ford A., and Jeraldine H. Brooks.

1973. Concentrations of manganese, iron and zinc in juveniles of five estuarine-dependent fishes, p. 769-775. In D. J. Nelson [ed.], Radionuclides in ecosystems. Proceedings of the Third National Symposium on Radioecology, U.S. Atomic Energy Commission, Oak Ridge, Tennessee.

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Culley, Michael.

1971. The pilchard - Biology and exploitation. Pergamon Press, New York, 241 p.

Menhaden reduction industry mentioned.

Dahlberg, Michael D.

1966. A systematic review of the North American species of menhaden, genus Brevoortia. Ph.D. thesis, Tulane University, New Orleans, 161 p. (Dissertation Abstracts International, vol. 27, p. 1651-B).

A key to menhaden species and hybrids, describes the various forms, presents synonymies and recent references, and discusses hybridization, geographic variation, population structure, comparative lipid analysis, condition factors, and fish meal indexes. Published in part Dahlberg (1970a).

Dahlberg, Michael D.

1969a. Fat cycles and condition factors of two species of menhaden, Brevoortia (Clupeidae), and natural hybrids from the Indian River of Florida. American Midland Naturalist, vol. 82, no. 1, p. 117-126.

Dahlberg, Michael D.

1969b. Incidence of the isopod, Olencira praegustator, and copepod, Lernaeenicus radiatus, in three species and hybrid menhaden (Brevoortia) from the Florida coasts, with five new host records. Transactions of the American Fisheries Society, vol. 98, no. 1, p. 111-115.

Monthly incidence of the two parasites from B. tyrannus, B. patronus, B. smithi and hybrids B. tyrannus X B. smithi and B. patronus X B. smithi from the Atlantic and Gulf coasts of Florida.

Dahlberg, Michael D.

1970a. Atlantic and Gulf of Mexico menhadens, genus Brevoortia (Pisces: Clupeidae). Bulletin of the Florida State Museum, Biological Sciences, vol. 15, no. 3, p. 91-162.

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Dahlberg, Michael D.

1970b. Frequencies of abnormalities in Georgia estuarine fishes. Transactions of the American Fisheries Society, vol. 99, no. 1, p. 95-97.

Pughead B. tyrannus reported from northeast Florida. One injured B. tyrannus among 414 examined.

Dahlberg, Michael D.

1972. An ecological study of Georgia coastal fishes. National Marine Fisheries Service, Fishery Bulletin, vol. 70, no. 2, p. 323-353.

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Dahlberg, Michael D., and Eugene P. Odum.

1970. Annual cycles of species occurrence, abundance, and diversity in Georgia estuarine fish populations. American Midland Naturalist, vol. 83, no. 2, p. 382-392.

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Daiber, Franklin C.

1963. Tidal creeks and fish eggs, role of tidal flow, salinity, and light in distribution of fish eggs and larvae. Estuarine Bulletin, vol. 7, nos. 2-3, p. 6-14.

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Davis, Jackson.

1970. Exploring for schooling pelagic fishes in Middle Atlantic Bight. Commercial Fisheries Review, vol. 32, no. 3, p. 23-24.

Menhaden fishing technique used in landing schooling fish.

Dawson, C. E.

1964. A bibliography of anomalies of fishes. Gulf Research Reports, vol. 1, no. 6, p. 308-399.

B. patronus, cites Gunter and Ward (1961).

Dawson, C. E.

1966. A bibliography of anomalies of fishes. Supplement 1. Gulf Research Reports, vol. 2, no. 2, p. 169-176.

Listed Schwartz (1965).

Dawson, C. E.

1971. A bibliography of anomalies of fishes. Supplement 2. Gulf Research Reports, vol. 3, no. 2, p. 215-239.

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Day, John W., Jr.,William G. Smith, and Charles S. Hopkinson, Jr.

1973. Some trophic relationships of marsh and estuarine areas, p. 115-135. In R. H. Chabreck [ed.], Proceedings of the Coastal Marsh and Estuary Management Symposium, Louisiana State University.

Menhaden listed among the lower trophic level fishes.

Day, John, W., Jr., William G. Smith, Paul R. Wagner, and Wilmer C. Stowe.

1973. Community structure and carbon budget of a salt marsh and shallow bay estuarine system in Louisiana. Louisiana State University, Publ., LSU-SG-72-04, 79 p.

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De Buen, Fernando.

1966. Resultados de una campana ictiologica en las provincias del Norte. Universidad de Chile, Estudios Oceanologicos, vol. 2, p. 5-9.

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Derickson, W. Kenneth, and Kent S. Price, Jr.

1973. The fishes of the shore zone of Rehoboth and Indian River bays, Delaware. Transactions of the American Fisheries Society, vol. 102, no. 3, p. 553-562.

Atlantic menhaden among fishes reported.

de Sylva, Donald P.

1959. Marshes, menhaden and marlin. Delaware Conservationist, vol. 3, no. 3, p. 7, 10-11.

Destruction of marshes threaten habitat of young menhaden.

de Sylva, Donald P.

1969. Theoretical considerations of the effects of heated effluents on marine fishes, p. 229-293. In Peter A. Krenkel and Frank L. Parker [eds.], Biological aspects of thermal pollution. Vanderbilt University Press, Nashville.

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DiCapua, Richard A.

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DiCapua, Richard A.

1969. On the application of immunological techniques in geographic group studies of Atlantic sea herring, Clupea harengus. II. Herring serum analysis by gel diffusion. Journal of Experimental Zoology, vol. 172, no. 1, p. 11-24.

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Domanevskii, L. M., and V. A. Rikhter.

1968. Key to families of principal commercial fish of the Northwest Atlantic and description of species. Fisheries Research Board of Canada, Translation Series no. 1128, 54 p.

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Dovel, William.

1967. Fish eggs and larvae of the Magothy River, Maryland. Chesapeake Science, vol. 8, no. 2, p. 125-129.

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Dovel, William L.

1968. Predation by striped bass as a possible influence on population size of the Atlantic croaker. Transactions of the American Fisheries Society, vol. 97, no. 4, p. 313-319.

B. tyrannus listed as a principal food of striped bass.

Dovel, William L.

1971. Fish eggs and larvae of the upper Chesapeake Bay. Natural Resources Institute, University of Maryland, Special Report no. 4, 71 p.

Menhaden eggs collected in spring and fall at Solomons, Md., temperature range 13-20°C, salinity 10-22 ppt. Young menhaden appeared in upper estuarine areas from late March to late June.

Dragovich, Alexander.

1969. Review of studies of tuna food in the Atlantic Ocean. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 593, 21 p.

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Dryfoos, Robert L., Randall P. Cheek, and Richard L. Kroger.

1973. Preliminary analyses of Atlantic menhaden, Brevoortia tyrannus, migrations, population structure, survival and exploitation rates and availability as indicated from tag returns. National Marine Fisheries Service, Fishery Bulletin, vol. 71, no. 3, p. 719-734.

From over 200,000 recoveries of more than 1 million tagged Atlantic menhaden, estimates of survival, exploitation and mortality rates were made.

Duke, Thomas W., John P. Baptist, and Donald E. Hoss.

1966. Bioaccumulation of radioactive gold used as a sediment tracer in the estuarine environment. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 65, no. 2, p. 427-436.

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Dunbar, Gary S.

1958. Historical geography of the North Carolina Outer Banks. Louisiana State University Studies, Coastal Studies Series no. 3, 234 p.

Early account of menhaden fishing in North Carolina.

Dunham, Fred.

1972. A study of commercially important estuarine-dependent industrial fishes. Louisiana Wild Life and Fisheries Commission, Technical Bulletin No. 4, 63 p.

Distribution and abundance of Gulf menhaden, B. patronus, samples from a trawl survey July 1969 to June 1972. Occurrence of fishes other than menhaden in purse-seine landings by sampling during 1971-72.

Ehrlich, Paul R., and Anne H. Ehrlich.

1970. Population, resources, environment: Issues in human ecology. W. H. Freeman Co., San Francisco. 383 p.

Menhaden over exploited.

Eisler, Ronald.

1965. Erythrocyte counts and hemoglobin content in nine species of marine teleosts. Chesapeake Science, vol. 6, no. 2, p. 119-120.

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Evermann, B. W., and W. C. Kendall.

1900. Check-list of the fishes of Florida. U.S. Commissioner of Fish and Fisheries, Report for 1899, p. 37-103.

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Fahy, William E.

1966. Species composition of the North Carolina industrial fish fishery. Commercial Fisheries Review, vol. 28, no. 7, p. 1-8.

Menhaden composed 42.9 percent by weight of trash fish caught in long-haul and pound-net fishery.

Fairbanks, Randall B., W. Stephen Collings, and Wendell T. Sides.

1971. An assessment of the effects of electrical power generation on marine resources in the Cape Cod Canal. Massachusetts Department of Natural Resources, Division of Marine Fisheries, 48 p.

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Finucane, John H.

1969a. Antimycin as a toxicant in a marine habitat. Transactions of the American Fisheries Society, vol. 98, no. 2, p. 288-292.

B. smithi included in a list of fishes experimentally killed by Antimycin A.

Finucane, John H.

1969b. Faunal production report, p. 11-15. In Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, fiscal year 1968. U.S. Fish and Wildlife Service, Circular 313.

B. smithi included in a list of fishes experimentally killed by Antimycin A.

Foehrenbach, Jack.

1972. Chlorinated pesticides in estuarine organisms. Journal of the Water Pollution Control Federation, vol. 44, no. 4, p. 619-624.

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Fontenot, Bennie J., Jr., and Howard E. Rogillio.

1970. A study of estuarine sportfishes in the Biloxi marsh complex, Louisiana. Louisiana Wild Life and Fisheries Commission, Dingell-Johnson Project, Completion report F-8, 172 p.

Gulf menhaden mentioned.

Fore, Paul L.

1971. The distribution of eggs and larvae of the round herring, *Etrumeus teres*, in the northern Gulf of Mexico. (Abstract). ASB (Association of Southeastern Biologists) Bulletin, vol. 18, no. 2, p. 34.

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Fore, Paul L., and Kenneth N. Baxter.

1972a. Collections of larval Gulf menhaden, *B. patronus*, from Galveston Entrance (1959-1969) and Sabine Pass (1963-1967), Texas. National Marine Fisheries Service, Data Report 74, 17 p.

Results of regular sampling of two Texas inlets for larval Gulf menhaden.

Fore, Paul L., and Kenneth N. Baxter.

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Catches of larval Gulf menhaden made in a series of collections during a 96-hour period at the inlet to Galveston Bay and the relation of these catches to tidal currents.

Forste, Robert H.

1964. Industry trends and indicators of economic performance in the menhaden fishery. Proceedings of the Gulf and Caribbean Fisheries Institute, 16th Annual Session, 1963, p. 30-46.

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Franklin, Lynn.

1972. Menhaden fishing. Oceans Magazine, vol. 3, no. 2, p. 65-73.

Popular description with numerous photographs.

Fuss, Charles M., Jr.

1968. A new thread herring fishery in eastern Gulf of Mexico. Commercial Fisheries Review, vol. 30, no. 6, p. 36-41.

Menhaden fishery mentioned.

Fuss, Charles M., Jr., John A. Kelly, Jr., and Kenneth W. Prest, Jr.

1969. Gulf thread herring: Aspects of the developing fishery and biological research. Proceedings of the Gulf and Caribbean Fisheries Institute, 21st Annual Session, 1968, p. 111-125.

Menhaden fishery compared to developing thread herring fishery.

General Dynamics -Electric Boat Division.

1971. Potential environmental effects of an offshore submerged nuclear power plant. Environmental Protection Agency, Water Pollution Control Research, GFI 06/71, vol. 1, 325 p.; vol. 2, 285 p.

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Godwin, Walter F., and Thomas L. Vaughn.

1968. An adult pugheaded American shad Alosa sapidissima. Transactions of the American Fisheries Society, vol. 97, no. 1, p. 50.

Cites Schwartz (1964-1965) reference to B. tyrannus.

Goldmintz, Daniel, and Joseph C. Hull.

1970. Bacterological aspects of fish protein concentrate production, p. 335-340. In Cyril J. Corum [ed.], Developments in industrial microbiology, vol. 11. American Institute of Biological Sciences, Washington, D.C.

Raw menhaden, B. tyrannus, had higher bacterial counts than hake, Urophycis chuss, but fish protein concentrate counts were similar.

Goodyear, C. Phillip.

1967. Feeding habits of three species of gars, Lepisosteus, along the Mississippi Gulf Coast. Transactions of the American Fisheries Society, vol. 96, no. 3, p. 297-300.

Longnose gar fed primarily at night on B. patronus juveniles in Mississippi estuaries.

Gordon, Bernard L.

1958. The bountiful menhaden. Nature Magazine, vol. 51, no. 6, p. 322-323, 332.

Popular, general account of Atlantic menhaden, B. tyrannus.

Gowanloch, James Nelson.

1950. New developments in the menhaden industry. Proceedings of the Gulf and Caribbean Fisheries Institute, 2nd Annual Session, 1949, p. 39-40.

General review of Gulf menhaden purse-seine fishery.

Graham, Herbert W.

1968. Trends in the marine fisheries of the Continental Shelf of the eastern United States. Transactions of the American Fisheries Society, vol. 97, no. 1, p. 77-82.

Brief report on menhaden landings with graph showing landings by region, 1930-66.

Green, J.

1968. The biology of estuarine animals. University of Washington Press, Seattle, 401 p.

The importance of Brevoortia to estuarine food web is mentioned.

Gregg, S. Alexander, Jr.

1968. The fisheries of North Carolina. M.S. thesis, University of North Carolina, Chapel Hill, 90 p.

Menhaden fishery and industry described, fishery statistics listed.

Gunter, Gordon.

1964. The Gulf of Mexico fishery in relation to the sport fisheries. Proceedings of the Gulf and Caribbean Fisheries Institute, 16th Annual Session, 1963, p. 99-108.

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Gunter, Gordon.

1967. Some relationships of estuaries to the fisheries of the Gulf of Mexico, p. 621-638. In George H. Lauff [ed.], Estuaries. American Association for the Advancement of Science, Publication no. 82, Washington, D.C.

Discussion of the commercial menhaden fishery in the Gulf, and the relationships of young menhaden to estuaries.

Gunter, G.

1969. Fisheries in coastal lagoons, p. 663-670. In Agustin Ayala Castanares and Fred B. Phleger [eds.], Coastal lagoons, a symposium. Universidad Nacional Autonoma de Mexico, Cuidad Universitaria.

Gulf menhaden fishery mentioned.

Gunter, Gordon, and Gordon E. Hall.

1963. Biological investigations of the St. Lucie estuary (Florida) in connection with Lake Okeechobee discharges through the St. Lucie Canal. Gulf Research Reports, vol. 1, no. 5, p. 189-307.

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Gulf menhaden, B. patronus, included.

Gusev, E. E.

1964. Some peculiarities in menhaden morphology, Brevoortia tyrannus (Latrobe). Contributions to Commercial Fisheries Research of the Artic Basin, N. M. Knipovicha Institute (PINRO), no. 2, p. 13-16. Trans. J.M. Moulton, Bowdoin College, Brunswick, Me.

Discussion of filter feeding of menhaden with description of intestinal tract structure.

Hall, F. G.

1928. Blood concentration in marine fishes. Journal of Biological Chemistry, vol. 76, p. 623-631.

Increased concentration of blood elements of B. tyrannus during asphyxiation followed by a weight loss of the spleen.

Harder, Wilhelm.

1964. Anatomie der Fische, vol. 2A. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 308 p.

Alimentary tract of Brevoortia mentioned.

Hatton, S. R., and G. R. Smalley.

1938. Reduction process for sardines in California. California Fish and Game, vol. 24, no. 4, p. 391-414.

Menhaden fishery mentioned.

Hays, H., and R. W. Risebrough.

1972. Pollutant concentrations in abnormal young terns from Long Island Sound. Auk, vol. 89, no. 1, p. 19-35.

Concentrations of DDT and PCB compounds and mercury in Atlantic menhaden.

Heald, Eric J.

1968. Atlas of the principal fishery resources on the Continental Shelf from New York to Florida. Prepared for the E. I. du Pont de Nemours Company, University of Miami, Institute of Marine Sciences, 225 p.

Brief account of fishery by regions along the Atlantic Coast with three charts for menhaden. B. tyrannus discussed and B. smithi listed.

Heald, Eric J., and Raymond C. Griffiths.

1967. The age determination, from scale readings, of the sardine, Sardinella anchovia, of the Gulf of Cariaco, Eastern Venezuela. Venezuela Ministerio de Agricultura y Cria, Investigaciones Pesqueras, Serie Recursos y Explotacion Pesqueras, vol. 1, no. 10, p. 375-446.

Mentions aging of B. tyrannus.

Hela, Ilmo.

1967. Meritieteen tehtavista. Merentutkimuslaitoksen Julkaisu Havsforskningsinstitutets Skrift, no. 222, 55 p.

B. tyrannus and menhaden fishery mentioned.

Henry, Kenneth A.

1965. Biological investigations of purse seine fishery for Atlantic menhaden. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 519, 12 p.

Compilation of fishery statistics.

Henry, Kenneth A.

1968. Exploitation and biological research of Atlantic menhaden, p. 265-273. In Transactions of the National Symposium on Ocean Sciences and Engineering of the Atlantic Shelf. Marine Technology Society, Washington, D. C.

General account of menhaden studies.

Henry, Kenneth A.

1969. Menhaden fisheries, p. 393-398. In Frank E. Firth [ed.], The encyclopedia of marine resources. Van Nostrand Reinhold Co., New York.

General account of the menhaden fishery with landings, 1942-66.

Henry, Kenneth A.

1971. Atlantic menhaden (Brevoortia tyrannus) resource and fishery - analysis of decline. National Marine Fisheries Service, Special Scientific Report - Fisheries 642, 32 p.

Analysis of age and size, fishing effort, catch and population dynamics of the Atlantic menhaden resource, 1955-68.

Henry, Kenneth A., Edwin B. Joseph, Charles M. Bearden, and John W. Reintjes.

1965. Atlantic menhaden...a most abundant fish. Atlantic States Marine Fisheries Commission, Leaflet no. 2, 4 p.

Popular general account.

Henry, Kenneth A., Joseph H. Kutkuhn, and Staff.

1968. Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1967. U.S. Fish and Wildlife Service, Circular 287, 22 p.

An annual review of menhaden research including development and oceanic distribution of larval menhaden, response of young menhaden to environmental changes, abundance of young-of-the-year menhaden, and population dynamics of Atlantic and Gulf resources by sampling catch and mark-recapture methods.

Henry, Kenneth A., Joseph H. Kutkuhn, and Staff.

1970a. Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1968. U.S. Fish and Wildlife Service, Circular 341, 24 p.

An annual review of menhaden research including menhaden life history and biology, menhaden population dynamics, and menhaden tagging.

Henry, Kenneth A., Joseph H. Kutkuhn, and Staff.

1970b. Research in fiscal year 1969 at the Bureau of Commercial Fisheries Laboratory, Beaufort, N.C. U.S. Fish and Wildlife Service, Circular 350, 49 p.

An annual review of menhaden research including life history of Atlantic and Gulf menhaden, estimation of larval and juvenile abundance, rearing menhaden, schooling and migratory behavior, tagging and population dynamics of Atlantic and Gulf menhaden.

Henry, Kenneth A., and Staff.

1965. Annual report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1964. U.S. Fish and Wildlife Service, Circular 215, 27 p.

An annual review of menhaden research including sampling of the Atlantic and Gulf fishery, morphology and population studies, estimation of juvenile abundance and estuarine biology of young menhaden.

Henry, Kenneth A., and Staff.

1966. Annual report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1965. U.S. Fish and Wildlife Service, Circular 240, 39 p.

An annual review of menhaden research including classification and distribution of North American menhadens, estuarine survival of young menhaden, abundance of juvenile menhaden, structure and biology of Gulf menhaden stocks and population dynamics of Atlantic and Gulf menhaden.

Henry, Kenneth A., and Staff.

1967. Report of the Bureau of Commercial Fisheries Biological Laboratory, Beaufort, N.C., for the fiscal year ending June 30, 1966. U.S. Fish and Wildlife Service, Circular 264, 30 p.

An annual review of menhaden research including classification and distribution of North American menhaden, response of juvenile menhaden to temperature and salinity, abundance of young menhaden, biology of Gulf of Mexico menhaden and sampling the Atlantic and Gulf purse-seine fisheries.

Herke, William H.

1968. Weirs, potholes and fishery management, p. 193-211. In John D. Newsom [ed.], Proceedings of the Marsh and Estuary Management Symposium. Thomas J. Moran's Sons, Inc., Baton Rouge.

Menhaden catches at Grand Bayou, Louisiana, with surface trawl and weir. Catches with trawl from January through June at 10 sites.

Herke, William H.

1969. A boat-mounted surface push-trawl for sampling juveniles in tidal marshes. Progressive Fish-Culturist, vol. 31, no. 3, p. 177-179.

Menhaden, Brevoortia sp., caught with push-trawl.

Herke, William H.

1971. Use of natural, and semi-impounded Louisiana tidal marshes as nurseries for fishes and crustaceans. Ph.D. thesis, Louisiana State University, 242 p. (Dissertation Abstracts International, vol. 32, p. 2654-B).

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Hess, Paul W.

1961. Food habits of two dasyatid rays in Delaware Bay. Copeia, 1961, no. 2, p. 239-241.

B. tyrannus included in the food of rays.

Hettler, William F., Jr.

1968. Artificial fertilization among yellowfin and Gulf menhaden (Brevoortia) and their hybrid. Transactions of the American Fisheries Society, vol. 97, no. 2, p. 119-123.

Eggs of B. smithi were fertilized with sperm from B. smithi, B. patronus, and hybrids of the two species. Resulting larvae reared through the yolk-sac stage.

Hettler, William F., Jr.

1970. Rearing larvae of yellowfin menhaden, Brevoortia smithi. Copeia, 1970, no. 4, p. 775-776.

Ova and sperm were obtained from sexually mature B. smithi and were hatched and reared. The last larva, 14.9 mm T.L. survived 32 days.

Hettler, William F., Jr.

1971. A yellowfin menhaden without pelvic fins. Quarterly Journal of the Florida Academy of Sciences, vol. 34, no. 1, p. 63-66.

Adult B. smithi with no pelvic fins and no scar to indicate that they had been lost accidentally. X-ray examination did not show any structural remnants.

Hettler, William F., Jr.

1973. Rearing menhaden larvae (Part 2), p. 149-157. In A. L. Pacheco (ed.), Proceedings of a Workshop on Egg, Larval and Juvenile Stages of Fish in Atlantic Coast Estuaries. National Marine Fisheries Service, Middle Atlantic Coastal Fisheries Center, Technical Publication no. 1.

Methods used to rear larval B. smithi in the laboratory from fertilized eggs.

Hettler, William F., Jr., Richard W. Lichtenheld, and Herbert R. Gordy.

1971. Open seawater system with controlled temperature and salinity. Progressive Fish-Culturist, vol. 33, no. 1, p. 3-11.

Seawater system designed to rear Atlantic menhaden.

Higham, Joseph R., and William R. Nicholson.

1964. Sexual maturation and spawning of Atlantic menhaden. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 63, no. 2, p. 255-271.

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Hildebrand, Samuel F.

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Jones, Robert S.

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Love, R. M., J. A. Lovern, and N. R. Jones.

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McLusky, Donald S.

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1963. Monogenetic trematodes from some Chesapeake Bay fishes. Part I: The superfamilies Capsaloidea Price, 1936 and Diclidophoroidea Price, 1936. Chesapeake Science, vol. 4, no. 4, p. 151-160.

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Manooch, Charles S., III.

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Mentioned occurrence of menhaden in balloon trawl catches in Bay.

Mansueti, Romeo J.

1962a. Effects of civilization on striped bass and other estuarine biota in Chesapeake Bay and tributaries. Proceedings of the Gulf and Caribbean Fisheries Institute, 14th Annual Session, 1961, p. 110-136.

Atlantic menhaden, B. tyrannus, mentioned.

Mansueti, Romeo J.

1962b. Eggs, larvae, and young of the hickory shad, Alosa mediocris, with comments on its ecology in the estuary. Chesapeake Science, vol. 3, no. 3, p. 173-205.

Figure comparing head outlines with larval Atlantic menhaden, B. tyrannus.

Mansueti, Romeo J.

1964. Eggs, larvae, and young of the white perch, Roccus americanus, with comments on its ecology in the estuary. Chesapeake Science, vol. 5, no. 1-2, p. 3-45.

Larvae of B. tyrannus mentioned.

Marcellus, Kenneth Lee.

1972. Fishes of Barnegat Bay, New Jersey, with particular reference to seasonal influences and the possible effects of thermal discharges. Ph.D. thesis, Rutgers University, 190 p. (Dissertation Abstracts, vol. 33, no. 5, p. 2185-B - 2186-B.)

B. tyrannus included in haul-seine catches. Only 75 caught during a 4-year study.

Margalef, R.

1969. Pelagic ecosystem in the area, p. 127. In Symposium on investigations and resources of the Caribbean Sea and adjacent regions. Abstract FAO Fisheries Report no. 71.1.

Brevoortia important among clupeoid fishes in the region.

Marine Pollution Bulletin.

1970. Fish kills in Florida. Marine Pollution Bulletin, vol. 1, no. 10, p. 148.

Ten to fifteen million menhaden (Brevoortia sp.) were killed in Escambia Bay on September 3, 1970. This is one of 42 kills reported in the Bay since June 21. Presumed cause of kills was over-nutrification, a condition that has caused summer kills of menhaden for the past 10 years.

Marine Pollution Bulletin.

1973. Menhaden killed near Pilgrim Power Station. Marine Pollution Bulletin, vol. 4, no. 6, p. 86.

Estimated kill of 10,000 adult Atlantic menhaden from gas embolism from supersaturation of water with nitrogen from plant effluent canal.

Marine Research Incorporated.

1973. Rome Point investigations. Quarterly Progress Report, June - August 1973, Marine Research Inc., East Wareham, Mass. 150 p. (unpaged).

Occurrence and numbers of eggs and larvae of Brevoortia tyrannus and other fishes in Narragansett Bay.

Marsh, M. C., and F. P. Gorham.

1905. The gas disease in fishes. Report of the U.S. Bureau of Fisheries for 1904, p. 343-395.

Menhaden mortalities in Narragansett Bay during the summer of 1904 with exophthalmia or "pop-eye".

Marshall, N. B.

1971. Explorations in the life of fishes. Harvard University Press, Cambridge, 204 p.

Brief comment on the coloration of juvenile Brevoortia.

Massmann, William H.

1962. Water temperature, salinities, and fishes collected during trawl surveys of Chesapeake Bay and York and Pamunkey Rivers, 1956-1959. Virginia Institute of Marine Science, Gloucester Point, Special Scientific Report no. 27, 57 p.

B. tyrannus included.

Massmann, William H.

1963. Annulus formation on the scales of weakfish, Cynoscion regalis, of Chesapeake Bay. Chesapeake Science, vol. 4, no. 1, p. 54-56.

Brief mention of scale growth of B. tyrannus.

Massmann, William H.

1967. A positive approach to coastal sport fishery problems. Proceedings of the 18th Annual Conference, Southeastern Association of Game and Fish Commissioners, 1964, p. 255-258.

Importance of estuaries to the young of menhaden.

Massmann, William H.

1971. The significance of an estuary on the biology of aquatic organisms of the middle Atlantic region, p. 96-109. In Philip A. Douglas and Richard H. Stroud [eds.], A symposium on biological significance of estuaries. Sport Fishing Institute, Washington, D. C.

Atlantic menhaden mentioned.

Massmann, William H., and Romeo J. Mansueti.

1963. Data from Virginia-Maryland cooperative fish trawl surveys in Chesapeake Bay - 1957 and 1958. Virginia Institute of Marine Science, Gloucester Point, Special Scientific Report no. 42, 21 p.

Catch of B. tyrannus with temperature and salinities.

Massmann, William H., John J. Norcross, and Edwin B. Joseph.

1963. Distribution of larvae of the naked goby, Gobiosoma bosci, in the York River. Chesapeake Science, vol. 4, no. 3, p. 120-125.

Menhaden occurrence briefly mentioned.

Matthiessen, George C.

1972-1973. Rome Point investigations. Quarterly Progress Reports, June-August, September-November and December 1973-February 1973, Marine Research Inc., East Wareham, Mass. (unpaged).

Mazyck, W. St. J.

1887. Dead fish along the coast of South Carolina. Bulletin of the U.S. Fish Commission for 1886, vol. 6, p. 413-414.

Mass mortality of young menhaden in late December of unknown causes.

Mead, A. D.

1898. Peridinium and the "red water" in Narragansett Bay. Science, vol. 8, no. 203, p. 707-709.

Atlantic menhaden, B. tyrannus, among the principal fish killed.

Meldrim, John W.

1971. An experimental study of the behavior of estuarine fishes to a proposed thermal effluent. Proceeding of the Fourth Mid-Atlantic Industrial Waste Conference, November, 1970, University of Delaware, p. 65-74.

B. tyrannus among estuarine fishes tested in the laboratory for avoidance responses to increased temperature gradients.

Meldrim, John W., and James J. Gift.

1971. Temperature preference, avoidance and shock experiments with estuarine fishes. Ichthyological Associates, Ithaca, New York, Bulletin 7, 72 p.

B. tyrannus prefer temperature at 70°F and avoid temperatures from 78-80°F.

Merchant, George, Jr.

1884. The incipiency of night-seining for mackerel. Bulletin of the U.S. Fish Commission, vol. 4, p. 142.

Seining menhaden at night.

Merriner, J. V., and W. L. Wilson.

1972. Jaw deformity (cross bite) of Atlantic menhaden, B. tyrannus, from Virginia. Chesapeake Science, vol. 13, no. 1, p. 62-63.

One B. tyrannus with deformed jaw was caught in James River with river herring, American shad and Bay anchovy.

Miller, Grant L., and Sherrell C. Jorgenson.

1969. Seasonal abundance and length frequency distribution of some marine fishes in coastal Georgia. U.S. Fish and Wildlife Service, Data Report 35, 102 p.

Length frequency of B. tyrannus and B. smithi by month with weather, tide, water temperature and salinity. Only other clupeoids were Anchoa hepsetus and A. mitchilli.

Miller, Grant L., and Sherrell C. Jorgenson.

1973. Meristic characters of some marine fishes of the Western Atlantic Ocean. National Marine Fisheries Service, Fishery Bulletin, vol. 71, no. 1, p. 301-312.

Brevoortia gunteri, patronus, tyrannus and smithi listed with counts of precaudal and caudal vertebrae, dorsal, anal and caudal fin rays.

Miller, John M.

1965. A trawl survey of the shallow Gulf fishes near Port Aransas, Texas. Publications of the University of Texas, Institute of Marine Science, vol. 10, p. 80-107.

Three small B. patronus (55, 68, and 190 mm) were captured at 3 and 6 fathoms on February 19, April 1, and June 2, 1964.

Miller, Robert Victor.

1969. Constancy of epibranchial organs and fourth epibranchial bones within species groups of clupeid fishes. Copeia, 1969, no. 2, p. 308-312.

Comparison of epibranchial organs and fourth epibranchial bones of 5 species of Brevoortia with species of Opisthonema, Dorosoma and Clupea.

Monod, Theodore.

1968. Le complexe urophore des poissons teleosteens. Memoires de l'Institut Fondamental d'Afrique Noire, no. 81, 705 p.

Ethmalosa fimbriata and B. tyrannus listed with figures of E. fimbriata.

Moseley, Frank N., and B. J. Copeland.

1969. A portable drop-net for representative sampling of nekton. Contributions in Marine Science of the University of Texas, Institute of Marine Science, vol. 14, p. 37-45.

B. patronus, the principal species caught.

Moss, S. A., and W. N. McFarland.

1970. The influence of dissolved oxygen and carbon dioxide on fish schooling behavior. Marine Biology, vol. 5, no. 2, p. 100-107.

Dense schooling of B. tyrannus mentioned.

Moulton, James M.

1956. The movements of menhaden and butterfish in a sound field. Anatomical Record, vol. 125, no. 3, p. 592.

Abstract of 15 minute motion picture.

Moulton, James M.

1963. Acoustic orientation of marine fishes and invertebrates. Ergebnisse der Biologie, Band 26, p. 27-39.

Reaction of menhaden to underwater sound.

Moulton, James M., and Richard H. Dixon.

1967. Directional hearing in fishes, p. 187-232. In W. N. Tavolga [ed.], Marine bio-acoustics, vol. 2, Pergamon Press, New York.

Brevoortia ear structure and function.

Moulton, James M., and Jules M. Lerner.

1963. The ear-air bladder connections of the menhaden, B. tyrannus. (Abstract). American Zoologist, vol. 3, no. 4, p. 498.

Roles of hearing, gas pressure regulation and depth perception.

Mulkana, Mohammed Saeed.

1966. The growth and feeding habits of juvenile fishes in two Rhode Island estuaries. Gulf Research Reports, vol. 2, no. 2, p. 97-167.

Occurrence of B. tyrannus and estimated growth from successive collections from July to October. Stomach contents of 300 young menhaden (10-80 mm) contained amorphous organic ooze and dinoflagellates with few diatoms or crustaceans.

Muncy, Robert J.

1960. A study of the comparative efficiency between nylon and linen gillnets. Chesapeake Science, vol. 1, no. 2, p. 96-102.

B. tyrannus among the clupeids listed in gillnet catches from Chesapeake Bay.

Musick, John A., and James G. Hoff.

1968. Vertebral anomalies in humpbacked specimens of menhaden, Brevoortia tyrannus. Transactions of the American Fisheries Society, vol. 97, no. 3, p. 277-278.

Three humpbacked menhaden were collected along with 335 normal menhaden near Buzzards Bay, Mass.

Myers, George S.

1964. A brief sketch of the history of ichthyology in America to the year 1850. Copeia, 1964, no. 1, p. 33-41.

A brief mention of the origin of the generic name Brevoortia.

Nahhas, F. M., and R. B. Short.

1965. Digenetic trematodes of marine fishes from Apalachee Bay, Gulf of Mexico. Tulane Studies in Zoology, vol. 12, no. 2, p. 39-50.

Digenetic trematodes in Brevoortia.

Nelson, Gareth J.

1967a. Epibranchial organs in lower teleostean fishes. Journal of Zoology, vol. 153, no. 1, p. 71-89.

Description of gill arches in Brevoortia and other clupeoid genera.

Nelson, Gareth J.

1967b. Gill arches of teleostean fishes of the family Clupeidae. Copeia, 1967, no. 2, p. 389-399.

The genera Brevoortia, Ethmalosa, and Ethmidium are discussed with reference to the morphology of gill arches.

Nicholson, William R.

1971a. Changes in catch and effort in the Atlantic menhaden purse-seine fishery, 1940-68. National Marine Fisheries Service, Fishery Bulletin, vol. 69, no. 4, p. 765-781.

Analysis of catch, number of vessel weeks, and catch per vessel week in the Atlantic menhaden fishery.

Nicholson, William R.

1971b. Coastal movements of Atlantic menhaden as inferred from changes in age and length distributions. Transactions of the American Fisheries Society, vol. 100, no. 4, p. 708-716.

Length frequency distributions plotted by age, month, and latitude support the hypothesis of an annual north-south movement.

Nicholson, William R.

1972a. Fishing pressure and its influence on Monday catches of Atlantic menhaden in the Chesapeake Bay purse-seine fishery. Chesapeake Science, vol. 13, no. 3, p. 215-218.

Until about 1955 Atlantic menhaden purse-seine catches in Chesapeake Bay were distributed equally among week days from Monday to Friday. From 1956-61 the catch landed on Mondays averaged about 22 percent of the weekly totals. As fishing pressure increased and the population decreased after 1961, the percentage of the catch landed on Mondays rose, averaging about 34 percent of the weekly total. The increase in Monday catches is attributed to greater availability of fish after reduced fishing over the weekend.

Nicholson, William R.

1972b. Population structure and movements of Atlantic menhaden, Brevoortia tyrannus, as inferred from back-calculated length frequencies. Chesapeake Science, vol. 13, no. 3, p. 161-174.

Conclusions from analysis of back-calculated fork lengths sampled from 1955-64: (1) mixing of menhaden of all ages from all areas occurs south of Cape Hatteras during the winter, (2) at the time of first annulus formation in early spring, age-1 menhaden segregate along the coast by size, which increases from south to north, (3) all menhaden do not return to the same area they occupied the previous year, (4) for normal year classes, recruitment into the fishable population may not be complete until late in the second summer of life.

Nicholson, William R., and Joseph R. Higham, Jr.

1964a. Age and size composition of the menhaden catch along the Atlantic coast of the United States, 1959 with a brief review of the commercial fishery. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 478, 34 p.

A review of the fishery for 1959 with distribution of purse-seine sets, length and weight by sex for four geographical areas and the North Carolina fall fishery.

Nicholson, William R., and Joseph R. Higham, Jr.

1964b. Age and size composition of the 1960 menhaden catch along the U.S. Atlantic coast with a brief review of the commercial fishery. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 479, 41 p.

A review of the fishery for B. tyrannus during 1960 with distribution of purse-seine sets and length and weight by sex for four geographical areas and the North Carolina fall fishery.

Nicholson, William R., and Joseph R. Higham, Jr.

1965. Age and size composition of the menhaden catch along the Atlantic coast of the United States, 1961, with a brief review of the commercial fishery. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 495, 28 p.

A review of the fishery for B. tyrannus during 1961 with distribution of purse-seine sets and length and weight by sex for four geographical areas and the North Carolina fall fishery.

Nicholson, William R., and Joseph R. Higham, Jr.

1966. Age and size composition of the menhaden catch along the Atlantic coast of the United States, 1962, with a brief review of the commercial fishery. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 527, 24 p.

A review of the fishery for B. tyrannus during 1962 with distribution of purse-seine sets and length and weight by sex for four geographical areas and the North Carolina fall fishery.

Norcross, J. J., and W. Harrison.

1967. Part I, Introduction, p. 3-9. In W. Harrison, J. J. Norcross, N. A. Pore, and E. M. Stanley, Circulation of shelf waters off the Chesapeake Bight, surface and bottom drift of Continental Shelf waters between Cape Henlopen, Delaware, and Cape Hatteras, North Carolina, June 1963-December 1964. U.S. Department of Commerce, ESSA Professional Paper no. 3.

Atlantic menhaden, B. tyrannus, are spawned at sea and larvae are transported into nursery areas by ocean currents.

Norden, Carroll R.

1966. The seasonal distribution of fishes in Vermilion Bay, Louisiana. Transactions of the Wisconsin Academy of Sciences, Arts and Letters, vol. 55, p. 119-137.

B. patronus was one of the three most abundant species in fish collections from Vermilion Bay. Larval menhaden first appeared in catches in November and continued into April. Mentioned occurrence of B. gunteri in nearby Gulf waters.

Odum, William E.

1968. Mullet grazing on a dinoflagellate bloom. Chesapeake Science, vol. 9, no. 3, p. 202-204.

The presence of B. tyrannus noted in Duplin River, near Sapelo Island, Ga.

Oishi, Keiichi, and Ayako Okumura.

1963. Likes and dislikes of fish meat. Part I. By some Americans. Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 14, no. 3, p. 182-192.

Americans dislike menhaden as a food source compared to beef and other marine products.

Ovchinnikov, V. V.

1964. The fish fauna composition of the Gulf of Mexico and some questions concerning its origin (in Russian). Trudy Atlanticheskii nauchno-issledovatel'skii Institut Rybnogo Khoziaistva i Okeanografii, vol. 11, p. 12-20.

B. tyrannus listed.

Oviatt, Candace, and George W. Gray, Jr.

1968. Juvenile lookdowns, Selene vomer, in Wickford Cove, Narragansett Bay, Rhode Island. Transactions of the American Fisheries Society, vol. 97, no. 1, p. 64.

B. tyrannus was taken in beach seines in the Bay.

Oviatt, C. A., A. L. Gall, and S. W. Nixon.

1972. Environmental effects of Atlantic menhaden on surrounding waters. Chesapeake Science, vol. 13, no. 4, p. 321-323.

Schools of Atlantic menhaden, B. tyrannus, have measurable effects upon the estuarine waters of Narragansett Bay, R.I., by their feeding, respiration and excretion. The concentrations of phytoplankton and oxygen decreased and ammonia increased within the immediate vicinity of schools.

Pacheco, Anthony L.

1962. Age and growth of spot in lower Chesapeake Bay, with notes on distribution and abundance of juveniles in the York River system. Chesapeake Science, vol. 3, no. 1, p. 18-28.

B. tyrannus mentioned.

Pacheco, Anthony L., and George C. Grant.

1965. Studies of the early life history of Atlantic menhaden in estuarine nurseries. Part I--Seasonal occurrences of juvenile menhaden and other small fishes in a tributary creek of Indian River, Delaware, 1957-58. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 504, 32 p.

Monthly occurrences and size range of juvenile B. tyrannus and other small fishes from 32 families are summarized from 800 seine collections. Salinity and temperature observations for each collection are included.

Pacheco, Anthony L., and George C. Grant.

1973. Immature fishes associated with larval Atlantic menhaden at Indian River Inlet, Delaware, 1958-61, p. 78-117. In A. L. Pacheco [ed.], Proceedings of a Workshop on Egg, Larval and Juvenile Stages of Fish in Atlantic Coast Estuaries. National Marine Fisheries Service, Middle Atlantic Coastal Fisheries Center, Technical Publication no. 1.

Atlantic menhaden, bay anchovy, American eel, Atlantic silverside, summer and winter flounder made up 70% by numbers of the 59 species of fish collected during October to May, 1958-61.

Parker, Jack C.

1965. An annotated checklist of the fishes of the Galveston Bay system, Texas. Publications of the University of Texas, Institute of Marine Science, vol. 10, p. 201-220.

B. gunteri was seldom found in the bay, while B. patronus was abundant throughout the year.

Parker, R. O., Jr.

1972. An electric detector system for recovering internally tagged menhaden, genus Brevoortia. National Marine Fisheries Service, Special Scientific Report - Fisheries 654, 7 p.

Menhaden with internal ferromagnetic tags are recovered by an electronic device that does not interfere with reduction plant operations. Date and locality of capture are obtained for tagged fish as they are unloaded from the fishing vessel.

Parker, R. O., Jr.

1973. Menhaden tagging and recovery: Part II. Recovery of internal ferromagnetic tags used to mark menhaden, genus Brevoortia. Marine Fisheries Review, vol. 35, nos. 5-6, p. 36-39. Atlantic Estuarine Fisheries Center Beaufort, N.C. 28516.

Plate and rotating grate magnets were installed in reduction plants to recover tags from menhaden. Recovery efficiency was determined at each plant with test lots of large and small tags.

Pearse, A. S.

1947. On the occurrence of ectoconsortes on marine animals at Beaufort, N.C. Journal of Parasitology, vol. 33, no. 6, p. 453-458.

External copepod parasites on B. tyrannus are mentioned.

Pearson, John C.

1929. Natural history and conservation of redfish and other commercial sciaenids on the Texas coast. Bulletin of the U.S. Bureau of Fisheries for 1928, vol. 44, p. 129-214.

Menhaden is included in food of red drum.

Perkins, Richard J., and Michael D. Dahlberg.

1971. Fat cycles and condition factors of Altamaha River shads. Ecology, vol. 52, no. 2, p. 359-362.

Menhaden is mentioned in comparison with maximum fat content for Atlantic and Gulf menhadens.

Perret, William Stanley.

1966. Occurrence, abundance, and size distribution of fishes and crustaceans collected with otter trawl in Vermilion Bay, Louisiana. M.S. thesis, University of Southwestern Louisiana, Lafayette, La., 64 p.

B. patronus occurred at all stations.

Perret, William S.

1968. Menhaden or pogies: Louisiana's most valuable commercial fish. Louisiana Conservationist, vol. 20, nos. 1 & 2, p. 14-15.

Popular account of the purse-seine fishery for Gulf menhaden.

Peters, David S.

1972. Feeding selectivity in juvenile Atlantic menhaden, Brevoortia tyrannus, (Pisces: Clupeidae). (Abstract). ASB (Association of Southeastern Biologists) Bulletin, vol. 19, no. 2, p. 91.

Laboratory experiments to determine if menhaden feed selectively show that suspended and bottom particles of larger sizes were preferred to fine inorganic silt. Menhaden caught in the natural habitat ate mixed plankton while avoiding suspended silt.

Peterson, Ross.

1967. Design and economics of a new 86-foot aluminum multi-purpose fishing vessel. Proceedings of the Gulf and Caribbean Fisheries Institute, 19th Annual Session, 1966, p. 39-48.

A menhaden vessel is described.

Poole, John C.

1964. Feeding habits of the summer flounder in Great South Bay. New York Fish and Game Journal, vol. 11, no. 1, p. 28-34.

B. tyrannus is listed as a food item of the summer flounder.

Pratt, Joseph Hyde.

1917. The fisheries of North Carolina. Journal of the Elisha Mitchell Scientific Society, vol. 32, no. 4, p. 149-175.

B. tyrannus included among the important fisheries of the state.

President's Science Advisory Committee. Panel on Oceanography.

1966. Effective use of the sea. U.S. Government Printing Office, Washington, D. C.

Menhaden fishery is mentioned.

Pristas, Paul J.

1970. BCF scientists tag and recover menhaden. Commercial Fisheries Review, vol. 32, nos. 8-9, p. 47-49.

A brief review of menhaden tagging during 1966-69. Reported that 1,066,357 Atlantic menhaden, *B. tyrannus*, were tagged, with 203,037 recovered; and 35,198 Gulf menhaden, *B. patronus* were tagged with 6,860 recovered.

Pristas, Paul J., and Thurman D. Willis.

1973. Menhaden tagging and recovery: Part I. Field methods for tagging menhaden, genus *Brevoortia*. Marine Fisheries Review, vol. 35, nos. 5-6, p. 31-35.

Methods and equipment used to mark over 1 million *B. tyrannus* and *B. patronus* along the Atlantic and Gulf coasts of th U.S. from 1966-1971.

Raney, Edward C.

1952. The life history of the striped bass, *Roccus saxatilis* (Walbaum). Bulletin of the Bingham Oceanographic Collection, Yale University, vol. 14, art. 1, p. 5-97.

Menhaden is listed as a food item of the striped bass.

Rass, Theodore S.

1936. On types of fish eggs and their bearing on the classification of fishes. Doklady Akademii Nauk S.S.S.R., Seriya Biologiya, vol. 2, no. 7, p. 303-307.

Compared three types of clupeid eggs and allied Brevoortia with Sardina, Sardinella, and Clupeionella rather than with Alosa and Caspialosa.

Rass, Theodore S.

1937. Pigmentation of embryos and larvae in the herring family (Clupeidae) as an adaptation to a pelagic mode of life. Byulleten' Moskovskogo Obshchestva Ispytatelei Prirody, Otdel Biologicheskii, S.S.S.R., vol. 56, p. 155-164.

Groups Brevoortia with other pelagic clupeids that have pigment along dorsal aspect of larvae presumably to protect nervous system from sunlight (In Russian with English summary).

Rass, T. S.

1967. Geographical principles for the development of fisheries in the world's ocean (in Russian). Gidrobiologicheskiy Zhurnal, vol. 3, no. 5, p. 22-31.

Menhaden, Brevoortia sp., occur in Southern Boreal (moderately warm waters).

Rawls, Charles K.

1965. Field tests of herbicide toxicity to certain estuarine animals. Chesapeake Science, vol. 6, no. 3, p. 150-161.

B. tyrannus mentioned.

Ray, Clayton E., Alexander Wetmore, David H. Dunkle, and Paul Drez.

1968. Fossil vertebrates from the marine Pleistocene of Southeastern Virginia. Smithsonian Miscellaneous Collection, vol. 153, no. 3, Publication 4742, 25 p.

Brevoortia sp.: Menhaden. Specimens identified are a preoperculum (USNM 25064) and an operculum (USNM 25065). The genus is known from the Pliocene of North Africa but is previously unrecognized as a fossil in North America. Its recent distribution in the Western Atlantic is from Brazil to Nova Scotia.

Recksiek, Conrad W., and James D. McCleave.

1973. Distribution of pelagic fishes in the Sheepscot River-Back River Estuary, Wiscasset, Maine. Transactions of the American Fishery Society, vol. 102, no. 3, p. 541-551.

Atlantic menhaden among the species reported.

Reintjes, John W.

1963. An initial inquiry into a photoelectric device to detect menhaden marked with fluorescent pigments. International Commission for the Northwest Atlantic Fisheries, North Atlantic Fish Marking Symposium, Special Publication no. 4, p. 362-368.

Unsuccessful preliminary attempts to mark menhaden with fluorescent pigments for electronic detection.

Reintjes, John W.

1964a. Annotated bibliography on biology of menhadens and menhaden-like fishes of the world. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 63, no. 3, p. 531-549.

Bibliography of Brevoortia, Ethmalosa and Ethmidium with major references to 1957 and all references, 1958-62.

Reintjes, John W.

1964b. The importance of the occurrence of menhaden in the coastal waters and estuaries of peninsular Florida. Proceedings of the Gulf and Caribbean Fisheries Institute, 16th Annual Session, 1963, p. 108-112.

The distribution and potential fishery for three species of Brevoortia in Florida is discussed.

Reintjes, John W.

1969. Synopsis of biological data on the Atlantic menhaden, Brevoortia tyrannus. U.S. Fish and Wildlife Service, Circular 320, 30 p. (FAO Species Synopsis no. 42).

Taxonomy, morphology, distribution, reproduction, life history, growth, behavior and abundance of Atlantic menhaden with data on size, age, and sex composition of the commercial catch. Description of fishing methods and equipment.

Reintjes, John W.

1970. The Gulf menhaden and our changing estuaries. Proceedings of the Gulf and Caribbean Fisheries Institute, 22nd Annual Session, 1969, p. 87-90.

A brief review of the role of estuaries in the life cycle of Gulf menhaden, B. patronus.

Reintjes, John W.

1971. Five-spot herring, Hilsa kelee, a potential marine resource of South India, p. 162-163. (Abstract). In Symposium on Indian Ocean and adjacent seas, their origin, science and resources. Marine Biological Association of India, Cochin.

Relation of American menhaden purse-seine fishery to potential resource of five-spot herring in the Indian Ocean.

Reintjes, John W., and Anthony L. Pacheco.

1966. The relation of menhaden to estuaries, p. 50-58. In A symposium on estuarine fisheries. American Fisheries Society, Special Publication no. 3.

Review of early life history of menhaden including oceanic spawning and the effects of temperature and salinity on the establishment and survival in estuarine nurseries.

Reintjes, John W., James Y. Christmas, Jr., and Richard A. Collins.

1960. Annotated bibliography on biology of American menhaden. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 60, no. 170, p. 297-322.

A review of the literature on the distribution, occurrence, abundance, life history, morphology, ecology and behavior of menhaden, genus Brevoortia, published prior to and during 1957.

Renfro, William C.

1960. Salinity relations of some fishes in the Aransas River, Texas. Tulane Studies in Zoology, vol. 8, p. 83-91.

Juvenile B. patronus collected in salinities from 0.5 to 54.3 ppt.

Renfro, William C.

1963. Gas-bubble mortality of fishes in Galveston Bay, Texas. Transactions of the American Fisheries Society, vol. 92, no. 3, p. 320-322.

Postlarval B. patronus mentioned.

Richards, C. E., and M. Castagna.

1970. Marine fishes of Virginia's eastern shore (inlet and marsh, seaside waters). Chesapeake Science, vol. 11, no. 4, p. 235-248.

B. tyrannus is included.

Richards, William L.

1968. Ecology and growth of juvenile tarpon, Megalops atlanticus, in a Georgia salt marsh. Bulletin of Marine Science, vol. 18, no. 1, p. 220-239.

Menhaden occurred in seine samples.

Robas, John S.

1961. The multiple-use of shrimp trawlers. Proceedings of the Gulf and Caribbean Fisheries Institute, 13th Annual Session, 1960, p. 59-62.

Menhaden fishery is mentioned.

Roessler, Martin A.

1970. Checklist of fishes in Buttonwood Canal, Everglades National Park, Florida, and observations on the seasonal occurrence and life histories of selected species. Bulletin of Marine Science, vol. 20, no. 4, p. 860-893.

B. smithi and hybrids by season, salinity, temperature, rainfall, and moon phase.

Roithmayr, Charles M.

1963. Distribution of fishing by purse-seine vessels for Atlantic menhaden, 1955-1959. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries no. 434, 22 p.

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Young, James S., and Charles I. Gibson.

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